Nonstructural Measures for Flood Risk Management

Course Objectives

Nonstructural flood risk reduction measures are an important consideration in flood risk management. This course is designed to provide participants with a better understanding of nonstructural measures and the analysis methods involved in planning, designing, and implementing these measures. The course offers opportunities to professional staff in flood plain management, hydraulics and hydrology, and civil works planning studies to become knowledgeable in this area. Its focus is on methodologies and procedures for performing reconnaissance and feasibility phase investigations for plan formulation, evaluation and implementation of the basic nonstructural measures including flood warning and preparedness.

Through lectures and workshops, students explore topics on realizing opportunities with nonstructural measures and to formulate alternatives and implement projects with nonstructural measures. The importance of nonstructural measures to the Corps flood risk management mission will be discussed. The relationship and relevance of nonstructural measures to the Actions for Change, the Civil Works Strategic Plan, the Environmental Operating Principles, watershed/systems planning, etc will be examined. The course will make the student very familiar with the basic nonstructural measures of elevation; dry flood proofing; wet flood proofing; small berms, levees, and walls; relocation, flood warning, and acquisition. Students will be shown where each nonstructural measure works best and how they compare to structural measures across a wide range of parameters dealing with flood, site, and building characteristics, and with economic, environmental, recreation, and social characteristics. The importance and relevance of the National Flood Insurance Program to flood risk management in terms of flood insurance and flood mitigation will be investigated. Laws, policies, statutes, executive orders, etc will be covered that relate directly to nonstructural measure formulation and implementation. Opportunities will be demonstrated with nonstructural measures in terms of accomplishing multi-objectives, partnering and collaboration, sustainability, and achieving long term flood risk reduction/management. The student will be shown how to conduct nonstructural benefit analysis, how to formulate nonstructural measures, and how to implement them. A field trip will be included to see nonstructural measures and explore possibilities for nonstructural measures. The overall objective of the course is to enable the participants to return home with a high comfort level in their ability to lead and/or assist in formulating and implementing nonstructural measures.

Monday

8:00 - 9:00 a.m.	**Welcome, Introduction, Administrative Documentation, Pre-Test**
9:00 - 9:45 a.m.	Lecture 1.1: **A Perspective on Flood Risk Management in the United States** The will be a broad overview of the current status of flood risk in the United States as a result of a historical reliance on structural measures to reduce flood damage and how the use of nonstructural measures could have had profound changes. Examples will be shown as a result of Hurricane Katrina with a focus on the role of nonstructural measures.
9:45 – 9:55 a.m.	Break
9:55 – 11:30 a.m.	Lecture 1.2: **The Corps Flood Damage Reduction Mission/Flood Risk Management Mission (FRM)** An overview of the comprehensive FRM mission, history and where the Corps agency is headed for this important public safety mission.
11:30 – 12:45 p.m.	Lunch
12:45 – 1:45 p.m.	Lecture 1.3: **The Relationship of the FRM Mission with the EOP, Civil Works Strategic Plan, Actions for Change, Comprehensive Perspectives, Watershed Focus, etc.** This overview will show the relevance of nonstructural measures to accomplishment of these objectives
1:45 – 2:45 p.m.	Lecture 1.4: **Overview and Introduction to the Most Commonly Utilized Nonstructural FRM Measures** Introduction and descriptions of the basic nonstructural measures used in reducing flood risk.
2:45 – 3:00 p.m.	Break
3:00 – 3:30 p.m.	Exercise 1.5: **Group Exercise and Discussion** Identification and description of NSM in your District.
3:30 – 4:15 p.m.	Lecture 1.6: **Overview of the National Flood Insurance Program (NFIP) and Its Role in Comprehensive FRM** An overview of the relevance of the NFIP to the Corps FRM mission in terms of the flood insurance program and the flood mitigation program of the NFIP. The NFIP is another nonstructural measure that all Corps civil works planners and engineers need to be familiar with.
4:15 – 4:30 p.m.	Discussions, Q&A from Day 1 and looking forward to Day 2.
6:00 – 8:00 p.m.	Ice Breaker reception and dinner (no host)

Tuesday

8:00 - 8:15 a.m.	Review of Day 1 and objectives for Day 2
8:20 - 9:20 a.m.	Lecture 2.1: **Nonstructural Measures (NSM) Appropriateness** This lecture will examine the basic nonstructural measures including the NFIP in terms of where they can be used, under what conditions, what are the opportunities, and a comparison to the basic structural measures.
9:20 – 9:50 a.m.	Lecture 2.2: **Statutes, Policies and Guidance Important to FRM and NSM** This lecture provides overview of select key references / guidance that must be met for all Corps FRM studies and projects; and, also specifically to NSM.
9:50 - 10:00 a.m.	Break
10:00 - 10:45 a.m.	Lecture 2.2: Continued
10:45 -11:30 a.m.	Lecture 2.3: **Opportunities with NSM** Nonstructural measures provide unique opportunities for other project outputs and synergies. Most important of these are ecosystem restoration, recreation, accomplishment of no adverse flood plain and environmental impacts, etc.
11:45 -1:00 p.m.	Class Photo & Lunch
1:00 – 1:20 pm	Exercise 2.4: **Introduction of Case Study Exercise, Glendive, Montana**
1:20 - 3:00 p.m.	Lecture 2.5: **Data Needs and Analysis for NSM and Analysis** A description will be provided of what data needs to be collected in terms of hydrology, hydraulics, economic, etc and in terms of aspects of the individual buildings, etc that are being considered for nonstructural measures flood risk reduction.
3:00 - 3:15 p.m.	Break
3:15 – 5:00 p.m.	Lecture 2.6 and Exercise: **Nonstructural Benefit Methodologies and Analysis; FDA and FIA** Overview of the methodologies and analysis for NSM, to include introduction to and use of the FDA and FIA software applications. Benefits from flood damage reduction and recreation will be shown relative to the basic nonstructural measures.
5:00 – 5:15 p.m.	Review and Q&A of Day 2 and looking forward to Day 3

Wednesday

8:00 - 8:15 a.m.	Review of Day 2 and Objectives for Day 3
8:15 – 9:30 a.m.	Lecture 3.1: **Nonstructural Plan Formulation - Module 1** An overview of the approach to multi-objective plan formulation for single purpose FRM with NSM. All aspects of plan formulation relative to nonstructural measures will be covered including the use of SCRB in evaluating multi objectives. Also included are examples from across the Corps of nonstructural plan formulation and implementation using flood damage reduction only and flood damage reduction in combination with recreation and also with ecosystem restoration. This will also include as an example one of the Corps most important current FRM studies-Mississippi Coastal Improvements Program (MsCIP).
9:30 - 9:45 a.m.	Break
9: 45 – 11:15 a.m.	Lecture 3.2: **Nonstructural Plan Formulation - Module 2** Continued, with more on the plan formulation approach, strategies with examples.
11:15 – 11:45: a.m.	Exercise 3.3: **Introduction and logistics of the afternoon field trip and exercise**
11:45 – 12:45 p.m.	Lunch
1:00 - 4:30 p.m.	Field Trip and case study exercise

Thursday

8:00 - 8:15 a.m.	Review from Day 3 and objectives for Day 4
8:15 – 9:30 a.m.	Lecture 4.1: **Nonstructural Plan Formulation - Module 3**
9:30 – 9:45 a.m.	Break
9:45 -12:00 noon	Exercise 4.2: **Team work on field exercise with presentations and discussion** The field trip of the previous day will be discussed in terms of reactions to what the nonstructural measures seen looked like and how they were used and of what problems and opportunities are present for use of nonstructural measures. Also to be discussed will be how these measures can be used in students home Districts.
1200 – 1:00 p.m.	Lunch
1:00 – 2:30 p.m.	Lecture 4.3: **Implementation of NSM** Nonstructural measures generally deal specifically with individual people and their respective property whereas structural measures generally do not have that level of specificity. Because of this, nonstructural measure implementation requires different implementation strategy than does structural measures.
2:30 – 4:30 p.m.	Exercise 4.4: **Case Study - Glendive, Montana** The case study at Glendive, Montana that was introduced on Tuesday will be examined by the students. The students will have the opportunity to use what has been learned and discussed in the lectures and the field trip to formulate a project using an actual FRM problem that exists. All aspects including problem definition, data needs, benefit analysis, plan formulation, selection, and implementation will be included. An overview of what the District has done will be provided at the end of this session.
4:30- 5:00 p.m.	End of Day 4 Review and looking to Day 5

Friday

8:00 - 8:20 a.m.	Review and Day 5 Objectives
8:20 - 9:30 a.m.	Lecture 5.1: **Overview on the Development of Flood Warning/Response Systems** This presentation will give background, goals, and status of some of the recent larger scope flood warning systems the Corps has participated in recently.
9:30 - 9:40 a.m.	Break
9:40 -10:45 a.m.	Lecture 5.2: **Flood Plain Management in the Year 2050 and the Role of NSM** The Second Gilbert White Forum was held in November 2007 with the topic of "Flood Plain Management in the Year 2050". At this forum, a group of experts in the field of FPM/FRM were invited to discuss the topic and to provide a vision to see what must be done between now and then to achieve satisfactory flood plain/flood risk management in 2050. The results of that forum will be presented and discussed with thoughts on the role of nonstructural measures.
10:45 -11:30 a.m.	Critique and Closing